

THE LUCY STUDENT PIPELINE ACCELERATOR AND COMPETENCY ENABLER (L'SPACE): A NEW MODEL FOR NASA STUDENT COLLABORATIONS TO ENHANCE STEM WORKFORCE DEVELOPMENT AT SCALE.

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Introduction: The Lucy Student Pipeline Accelerator and Competency Enabler (L'SPACE) Program is the student collaboration portion of NASA's Lucy Mission to the Trojan Asteroids and is designed to engage higher education science and engineering students in meaningful, mentor-based, experiential STEM workforce preparation at scale. The L'SPACE Program has two components (this abstract will be covering the Virtual L'SPACE Program):

1. L'SPACE Virtual Program is a certificated program and consists of two 12-week Virtual Academies - L'SPACE Academy 1 and L'SPACE Academy 2. Each academy has a capacity for 490 students run concurrently three times a year - Spring, Summer, and Fall through the current funding horizon of 2021. Students will be eligible to apply for Lucy-sponsored internships and to become a Lucy Ambassador if they elect to become involved in the Lucy Mission outreach; and
2. ASU Space Works Instrument Incubator consists of 3 levels and offered as 3-credit, face-to-face undergraduate courses through ASU's School of Earth and Space Exploration. These courses have also been cross-listed with ASU's Fulton School of Engineering. Each Space Works course has the capacity for 60 students and is offered in the academic year (Spring/Fall).

Goals: The overarching goals of the L'SPACE Program are to:

- Give diverse undergraduate STEM students practice in applying their discipline knowledge within a rigorous NASA team-based challenge;
- Provide instruction and mentoring to help professionalize students in the mission-based protocols and practices they are likely to encounter in exploration-focused work within the space ecosystem;
- Give students practice in working within interdisciplinary teams to optimize a project, staying on schedule to deliver a working prototype;
- Help students gain experience and practice in workforce development skills such as communication, collaboration, working with data,

visualization of data, internships, resumes, interviews, and best practices and strategies for education and public outreach.

Implementation: L'SPACE Academies - To train the next generation of prospective mission-savvy scientists and engineers, the L'SPACE Team is implementing a direct engagement strategy that will inspire, engage, mentor, and retain the interest of hundreds of undergraduate STEM students. Students will gain knowledge and best practices from people who are actually involved in missions and the content of the sessions will be tied to optimizing their L'SPACE project.

These L'SPACE Academies virtual trainings are being accomplished through two national, 12-week sessions which students can take the sequentially or non-sequentially. These Academies are national in scope with the initial Academy 1 in Fall 2018 having participation and completion of 350 students in 34 states and Puerto Rico. The second Academy 1 in Spring 2019 has 475 students (an increase of 26%) from 41 states and Puerto Rico (an increase of 17%). Academy 2 in Spring has 190 students registered to date. For the Lucy Internship opportunity, 118 students have applied to date. Twenty internships will be available each summer through 2021 and students will be placed at Southwest Research Institute, NASA Goddard, KinetX, Lockheed Martin, and Arizona State University.

The L'SPACE curriculum is designed and implemented by the L'SPACE Team at Arizona State University in partnership with the Lucy mission team at the Southwest Research Institute, and Lucy Co-I team members. Curriculum design and content is based on current STEM workforce development research and interviews conducted with NASA mission teams and aerospace companies involved in exploration.

Diversity: To enable a diverse participant pool, the L'SPACE program has partnered with NASA Space Grant and NASA MUREP for distribution of the opportunity. Students are also recruited from national science and engineering organizations that work with underserved groups (e.g., SACNAS, SWE, AISES, SHPE, NSBE, and MAES).

Evaluation: The program will be evaluated by an external evaluation, Martin Storksdieck from Oregon

State University and an internal evaluator, Sanlyn Buxner from PSI. All data and lessons-learned will be collected for each academy and will be used to inform the following academy. Evaluation will be in the form of pre-post surveys and face-to-face interviews. Plans are being formulated to publish results.

Summary: Leveraging the richness and complexity of the Lucy mission's goals, as well as the exceptional talent on the science and engineering teams, the L'SPACE team will create relevant, authentic STEM experiences for STEM students nationally through which they will catalyze and empower their career pathways in space science and engineering